PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-026923
(43)Date of publication of application : 25.01.2002

(51)Int.Cl. H04L 12/28
H04B 7/15
H04B 7/24

(21)Application number : 2000-204691
(22)Date of filing : 06.07.2000

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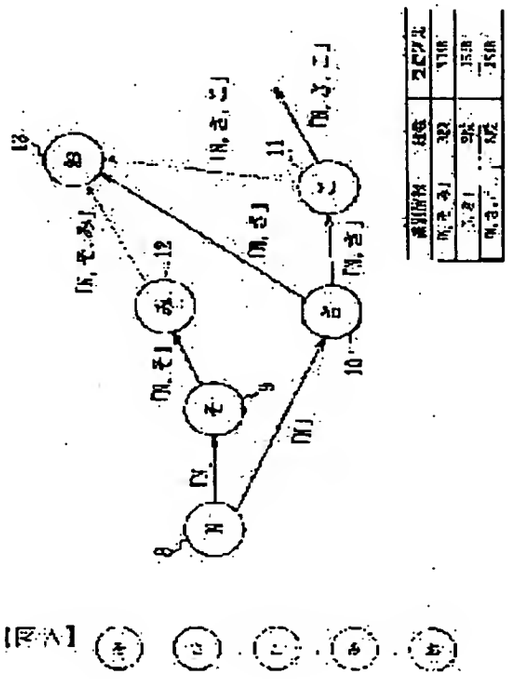
(54) SELF-PROLIFERATING WIRELESS DISTRIBUTION NETWORK

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a self-proliferating wireless distribution network that is immune to the effect of an increased noise level due to loop oscillation and an interference wave and can build up a stable and excellent wireless distribution network in a sort time depending on the operating state of a radio wave, which cannot have been realized with a conventional self-proliferating wireless distribution network.
SOLUTION: Each of reception stations 9, 10, 11, 12, and 13 being components of a network is provided at least with a means that transmits identification information of transmission stations denoting all transmission stations having been passed through until reaching a concerned reception station and including itself in the case of re-transmission, and also provided with a discrimination means that discriminates whether or not a radio wave received at present should be switched over to other radio wave on the basis of the comparison between measured values of a reception C/N and a transmission stage number identified from identification information of the transmission stations as to respective radio waves received by the reception station and a preset transmission stage number threshold value and a preset reception C/N.



[図A]

LEGAL STATUS

[Date of request for examination] 11.05.2005

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] Each receiving station which is the self-multiplication mold wireless distribution network constituted by a base station and two or more receiving stations which have a retransmission-of-message function, and constitutes this network A means to transmit the identification information of the sending station which shows all the sending stations via which in retransmitting a message it went including the receiving station concerned by the time it reached the receiving station concerned, The transmitting number of stages discriminated from the identification information of said sending station about each electric wave which the receiving station concerned received, and the measured value of a receiving CN ratio, The self-multiplication mold wireless distribution network characterized by having at least a judgment means to judge whether the electric wave under current reception is changed to other received electric waves, based on the comparison with the threshold of the transmitting number of stages set up beforehand, and the threshold of a receiving CN ratio set up beforehand.
[Claim 2] a self-multiplication mold wireless distribution network according to claim 1 — setting -- said judgment -- said transmitting number of stages -- oh [aforementioned] — the threshold of the transmitting number of stages by which an Ecklonia setup was carried out — small -- and the measured value of said receiving CN ratio -- oh [aforementioned] — the self-multiplication mold wireless distribution network characterized by being carried out about whether said transmitting number of stages is the smallest while satisfying that it is higher than the threshold of the receiving CN ratio by which an Ecklonia setup was carried out.
[Claim 3] It is the self-multiplication mold wireless distribution network by which it is carrying [when said judgment has two or more smallest things of said transmitting number of stages in a self-multiplication mold wireless distribution network according to claim 2, so that what has the highest measured value of said receiving CN ratio may be chosen from them]-out characterized.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the self-multiplication mold wireless distribution network constituted by the receiving station which starts the network which used the electric wave, especially has a retransmission-of-message function.
[0002]
[Description of the Prior Art] In this invention, the same frequency as the frequency of the electric wave which received informational [which was received by the electric wave / all or a part of], or the received frequency says transmitting again as retransmission of message using the electric wave of a different frequency.
[0003] If a receiving station retransmits a message unconditionally, the loop-formation oscillation by the same frequency will arise, or the noise level by the interference wave will rise, and it will become difficult to build a stable and good wireless distribution network. Therefore, the wireless distribution network which performs retransmission of message is used conventionally in the wireless distribution network on the principle of the 1 to 1 following communication links.
[0004] That is, the entrepreneur owned both the sending station and the receiving station, and the multistage junction in ground television broadcasting, the fixed micro circuit in a communication link, etc. are that an entrepreneur manages and grasps the use situation of a frequency, and have avoided the above-mentioned problem by retransmission of message. When forming a temporary network at terminals in the field of mobile computing etc., terminals are performing a bidirectional exchange and they have avoided the above-mentioned problem by retransmission of message.
[0005]
[Problem(s) to be Solved by the Invention] However, in the wireless distribution network (one-pair N communication link), the gestalt in which a receiving station usually receives directly the electric wave from the base station which an entrepreneur owns is taken. The information transmission from a base station to a terminal is the typical example in the individual reception in each home in ground television broadcasting, a cellular phone, etc.
[0006] If the circuit from a base station to each accepting station cannot be set up even when the accepting stations which should receive information are next doors even if, service is unenjoyable in the wireless distribution network of this gestalt. If this is seen from the side which gives its service, in order to satisfy the needs of the addressee of the fraction which cannot receive service, it means that it is necessary to newly install a base station. Therefore, in order to have built the wireless distribution network of the gestalt which receives the electric wave of a base station directly, and to install a base station, there was a trouble of requiring many time amount and costs.
[0007] The purpose of this invention is [0008] in offering the self-multiplication mold wireless distribution network which cannot be easily influenced of a loop-formation oscillation and the rise of the noise level by the interference wave, and can build a stable and good wireless distribution network in a short time according to the operating condition of an electric wave.
[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention

self-multiplication mold wireless distribution network Each receiving station which is the self-multiplication mold wireless distribution network constituted by a base station and two or more receiving stations which have a retransmission-of-message function, and constitutes this network A means to transmit the identification information of the sending station which shows all the sending stations via which in retransmitting a message it went including the receiving station concerned by the time it reached the receiving station concerned, The transmitting number of stages discriminated from the identification information of said sending station about each electric wave which the receiving station concerned received, and the measured value of a receiving CN ratio, It is characterized by having at least a judgment means to judge whether the electric wave under current reception is changed to other received electric waves, based on the comparison with the threshold of the transmitting number of stages set up beforehand, and the threshold of a receiving CN ratio set up beforehand.

[0009] moreover, this invention self-multiplication mold wireless distribution network -- said judgment -- said transmitting number of stages -- oh [aforementioned] -- the threshold of the transmitting number of stages by which an Ecklonia setup was carried out -- small -- and the measured value of said receiving CN ratio -- the above -- oh, while satisfying that it is higher than the threshold of the receiving CN ratio by which an Ecklonia setup was carried out, it is characterized by being carried out about whether it is the smallest thing of said transmitting number of stages.

[0010] Moreover, when the smallest thing of said transmitting number of stages has two or more said judgments, it is carrying [so that what has the highest measured value of said receiving CN ratio may be chosen from them]-out characterized by this invention self-multiplication mold wireless distribution network.

[0011]

[Embodiment of the Invention] With reference to an accompanying drawing, this invention is explained at a detail based on the gestalt of implementation of invention below. Drawing 1 constitutes this invention self-multiplication mold wireless distribution network with the radio equipment which performs a base station and other retransmission of message, is the same frequency (f1) as the received electric wave, and shows the example of 1 configuration of the radio equipment A which retransmits a message with the block diagram. Setting to drawing 1 , 1 is a main track system and 2 is a receiving circuit. - For a received electric-wave selection system and 6, the received electric-wave judgment section and 7 are [I and 3 / a control section and 4 / a sending circuit and 5] a receiving circuit. - It is II.

[0012] It explains per actuation. By the main track system 1, the electric wave which should be received out of the electric wave (each arrival electric wave is a frequency (f1)) which arrives at radio equipment A is chosen, and the conditions mentioned later perform retransmission-of-message control. Receiving-circuit-I shown with a sign 2 measures the receiving CN ratio of an electric wave which received by the receiving-circuit-I concerned, decodes the identification information of all the sending stations via which it went by the time the electric wave arrived at radio equipment A with the measured value, and sends it to a control section 3. When the receiving CN ratio measured in receiving-circuit-I is lower than the threshold of the CN ratio beforehand set as the control section 3, a received electric wave is changed with the control signal (change control) from a control section 3. In addition, when the receiving CN ratio in receiving-circuit-I is higher than the threshold of the CN ratio beforehand set as the control section 3, the change of a received electric wave is not performed. This is for the change of an electric wave to avoid increasing beyond the need.

[0013] Moreover, in a sending circuit 4, the identification information of all the sending stations from the base station to this radio equipment A is added to the electric wave to which it retransmits a message without performing the change of a received electric wave as mentioned above or being carried out, and it retransmits a message to it on the same frequency (f1) as a received electric wave. The control signal (retransmission-of-message control) from a control section 3 also performs control of retransmission of message.

[0014] Next, by the received electric-wave selection system 5, two or more electric waves which arrive at this radio equipment A are classified in time and spatially, and monitoring is

performed for every classified signal. First, the received electric-wave judgment section 6 is a receiving circuit which classifies a received electric wave using the arrival direction of an electric wave, or the time delay of electric-wave attainment on the electric wave from which the sending station via which it went differs, the electric wave from which a time delay differs by reflection of a building, and is shown with a sign 7. - II is supplied, respectively. Receiving circuit - In II, while measuring a receiving CN ratio about each of these received electric wave, the identification information of all the sending stations via which it went by the time it resulted in this radio equipment A is decoded, and such information (a receiving CN ratio, identification information of a sending station) is sent to a control section 3. In addition, the threshold of a transmitting number of stages besides above is also set to the control section 3 (refer to drawing 1).

[0015] As mentioned above, in a control section 3, change control judges that it is the need with the measured value of the receiving CN ratio of an electric wave which received first by receiving-circuit-I shown with a sign 2. Under the present circumstances, receiving circuit shown with a sign 7 when a receiving CN ratio is lower than the threshold of the CN ratio beforehand set as the control section 3 - Based on the measured value of the CN ratio of each received electric wave acquired by II, and the identification information of the sending station via which it went, the electric wave which should be received namely, broadcast again in the following procedures is chosen.

[0016] First, receiving circuit - What has not satisfied the conditions of the threshold of an above-mentioned receiving CN ratio and the threshold of a transmitting number of stages is excepted out of the candidate of the received electric wave supplied to II. Next, since what contains the identification information of this radio equipment A in the identification information of a sending station will produce a loop-formation oscillation, it is excepted from a candidate. By the above, although remained as a candidate, what has a small transmitting number of stages is chosen from inside. Moreover, when the multiple selection of what has a the same transmitting number of stages is made, the highest thing of the measured value of a receiving CN ratio is chosen in them. When a change candidate is extracted to one by the above procedure, a control section 3 is the timing set up for every network, and is sent to receiving-circuit-I which shows the control signal (change control) for performing change processing with a sign 2. In addition, when it changes also with the above-mentioned procedure and a candidate does not remain, the change of a received electric wave is not performed.

[0017] The changes of an electric wave which receive above are electric shielding by the building or the tree, installation of a new base station and a new receiving station, attenuation by the rainfall, etc., and can consider being generated when a receiving CN ratio changes a lot. Receiving-circuit-I shown with a sign 2 chooses the electric wave which should be received out of an arrival electric wave according to the change control from a control section 3. The judgment approach currently performed in the received electric-wave judgment section 6 shall be used for selection of an electric wave. For example, it is a receiving circuit when only the information on the arrival direction of an electric wave is used in the received electric-wave judgment section 6. - In I, the directivity of the receiving antenna connected to the receiving circuit shall be changed electrically or mechanically, and the electric wave (electric wave which should be chosen) which comes from the direction of desired shall be received.

[0018] It does not retransmit a message as what has the large demerit of retransmitting a message as it is in being lower than the threshold which the measured value of a receiving CN ratio when larger than the threshold which the transmitting number of stages from the base station of that electric wave set as the control section 3 beforehand although the electric wave received by receiving-circuit [which is shown with a sign 2 in this radio equipment A as mentioned above]-I was broadcast again in principle set as the control section 3 beforehand. In order to perform such actuation, a control section 3 is the timing set up for every network, and as it performs halt of retransmission of message, and initiation of retransmission of message, it performs retransmission-of-message control to a sending circuit 4.

[0019] In addition, the radio equipment which constitutes it from this invention self-multiplication mold wireless distribution network needs to decode the identification information of the sending station by which multiplex was carried out to the received electric wave, and to carry out

multiplex [of the identification information of all the sending stations via which it went by the time it resulted in the electric wave to transmit in the receiving station concerned]. As identification information of a sending station, it shall perform multiplex [of a frequency, time amount, and a sign / one] using the existing technique.
[0020] Drawing 2 shows the 1st operation gestalt of this invention self-multiplication mold wireless distribution network by the mimetic diagram. Setting to drawing 2 , 8 is a base station [outside 1].

9 is a receiving station [outside 2].

10 is a receiving station [outside 3].

11 is a receiving station [outside 4].

12 is a receiving station [outside 5].

13 [and] -- a receiving station [outside 6]

It is **********(ing). the following -- setting -- a receiving station -- [-- outside 2]9 -- [-- outside 3]10 -- [-- outside 4]11 -- [-- outside 5]12 -- [-- when outside 6]13 retransmits a message, these receiving stations are made to be referred to as a sending station [outside 2], [outside 3], [outside 4], [outside 5], and [outside 6], respectively. Moreover, when the outside 1] 8 of base station [is counted with the 1st step of a sending station and the station concerned becomes the 4th step or subsequent ones, it will not retransmit a message and the threshold of a CN ratio is set to 20dB. In addition, the character string which smelled and was enclosed in the parenthesis among drawing 2 expresses the identification information of a sending station.
[0021] It explains per actuation. First, the identification information "N" which shows what "this electric wave is transmitted for from the outside 1]8 of base station [" out of [1]8] base station [is added, and an electric wave is discharged. Base station [outside 1] The electric wave discharged from 8 is directly receivable out of [2]9 / 3]10] receiving station [and receiving station [. Receiving station [outside 2] By 9, the identification information "N and **" which shows what "this electric wave goes via the outside 1]8 of base station [and a sending station [outside 2]" in broadcasting this received electric wave again is added and broadcast again. Similarly, out of [3]10] receiving station [, the identification information "N and **" which shows what "this electric wave goes via the outside 1]8 of base station [and a sending station [outside 3]" is added and broadcast again.
[0022] Moreover, the identification information "N, **, and **" which shows what "this electric wave goes via a sending station [outside 3] and a sending station [outside 4] the base station [outside 1]8" out of [4]11] receiving station [since the electric wave of a sending station [outside 3] is receivable is added and broadcast again. the following -- the same -- a receiving station [outside 5] -- identification information "N which shows what "this electric wave goes

via a sending station [outside 2] and a sending station [outside 5] the base station [outside 1]8" in 12 since the electric wave of a sending station [outside 2] is receivable, and ** — seeing — " — it adds and retransmits a message.

[0023] Furthermore, out of [6]13] receiving station [, the electric wave of a sending station [outside 5], a sending station [outside 3], and a sending station [outside 4] can be received, and these signals are received in the receiving circuit 7 (receiving circuit - II) in the radio equipment A shown in drawing 1 . Each sending-station identification information of the received electric wave, a transmitting number of stages, and the measured value of a receiving CN ratio are shown in drawing 2 . First, since the threshold (20dB) of a receiving CN ratio is not satisfied, the measured value of the receiving CN ratio of the electric wave from a sending station [outside 3] is excepted. The electric wave from a sending station [outside 5] and a sending station [outside 4] does not contain the identification information (identification information of a sending station [outside 6]) of a local station. Moreover, a transmitting number of stages is also equal in three steps. Therefore, an electric wave with a bigger receiving CN ratio, i.e., the electric wave from a sending station [outside 5], is chosen.

[0024] In this way, if the electric wave from a sending station [outside 5] is chosen, since the receiving station [outside 6]13 will be counted from the outside 1]8 of base station [and will become the 4th step, it does not retransmit a message. Thus, a wireless distribution network can consist of that a receiving station retransmits a message based on predetermined conditions in a short time.

[0025] Drawing 3 shows the 2nd operation gestalt of this invention self-multiplication mold wireless distribution network by the mimetic diagram. Drawing 3 is the configuration of the wireless distribution network shown in drawing 2 , and differs from drawing 2 in the point that the propagation root from the sending station [outside 5] to the outside 6]13 of receiving station [is covered. Receiving station [outside 6] In 13, the electric wave of a sending station [outside 3] and a sending station [outside 4] is received. Each sending-station identification information of the received electric wave, a transmitting number of stages, and the measured value of a receiving CN ratio are shown in drawing 3 . According to the procedure explained in actuation of the control section 3 in the radio equipment A shown in drawing 1 , in the case of this operation gestalt, the electric wave of a sending station [outside 4] is chosen, it is the timing decided in the network and the change of a received electric wave is performed.

[0026] Since the receiving station [outside 6]13 is counted from the outside 1]8 of base station [and becomes the 4th step even if a received electric wave is changed, it does not retransmit a message. According to this invention, in this way, the redundant propagation root is securable, therefore even when the dependability of each propagation root is low, the dependability as a wireless distribution network can be secured, because a receiving station retransmits a message one after another based on predetermined conditions.

[0027] Drawing 4 shows the 3rd operation gestalt of this invention self-multiplication mold wireless distribution network by the mimetic diagram. Drawing 4 is the configuration of the wireless distribution network shown in drawing 2 , and is the case where the propagation root has reflection by the building. Receiving station [outside 3] In addition to the direct reception from the outside 1]8 of base station [, in 10, the electric wave (base station [outside 1] going via 8 and a sending station [outside 3]) which the electric wave of a local station reflected in the building 14 is also received. In the receiving circuit 7 (receiving circuit - II) in the radio equipment A shown in drawing 1 , these two electric waves are received as a candidate. When the latter is chosen, a loop-formation oscillation arises and the electric wave from the outside 1] 8 of base station [stops arriving. However, as actuation of the control section 3 in radio equipment A explained, in order that the electric wave containing the identification information of a local station (as a sending station) may not remain in a candidate, a change of an electric wave which receives this is not produced.

[0028] Although the case where the received electric wave and retransmission-of-message electric wave in a receiving station were the same frequency was explained in the above explanation, the same effectiveness can be acquired also about the case where it is the frequency from which a received electric wave and a retransmission-of-message electric wave

differ. drawing 5 — two frequencies f1 and f2 using it — the frequency of a received electric wave — f1 it is — the time — frequency f2 retransmitting a message — the frequency of a received electric wave — f2 it is — the time — frequency f1 The block diagram shows the example of 1 configuration of the radio equipment B to broadcast again. Although it is fundamentally the same, a receiving circuit 2 (receiving circuit - I), a sending circuit 4, the received electric-wave judgment section 6, and a receiving circuit 7 (receiving circuit - II) are [what showed the circuitry to drawing 1 also in drawing 5 , and] a frequency f1. And f2 It differs in the point which is the circuit which can respond to both. In addition, in this example, although frequency conversion from received frequency to transmit frequencies is needed, there are two kinds of approaches, the case where this is performed in a receiving circuit 2 (receiving circuit - I) or a sending circuit 4, and when changing into transmit frequencies in a sending circuit 4 after changing into IF frequency in a receiving circuit 2 (receiving circuit - I).

[0029] Drawing 6 shows the 4th operation gestalt of this invention self-multiplication mold wireless distribution network by the mimetic diagram. the radio equipment B shown in the radio equipment which retransmits a message by drawing 6 being the configuration of the wireless distribution network shown in drawing 2 at drawing 5 — using it — the frequency of a received electric wave — f1 it is — the time — frequency f2 retransmitting a message — the frequency of a received electric wave — f2 it is — the time — frequency f1 It is made to retransmit a message. first, a base station — [— the identification information "N" which shows what "this electric wave is transmitted for from the outside 1]8 of base station [" in outside 1]8 — adding — frequency f1 An electric wave is discharged. next, a receiving station — [— outside 2]9 — a base station — [— frequency f1 from outside 1]8 the identification information "N and **" which shows what an electric wave is received and "this electric wave goes via a sending station [outside 2] the base station [outside 1]8" — adding — frequency f2 It retransmits a message through radio. moreover, a receiving station — [— outside 3]10 — a base station — [— frequency f1 from outside 1]8 the identification information "N and **" which shows what an electric wave is received and "this electric wave goes via a sending station [outside 3] the base station [outside 1]8" — adding — frequency f2 It retransmits a message through radio.

[0030] moreover, a receiving station — [— outside 4]11 — a sending station — [— the identification information "N, **, and **" which shows what "this electric wave goes via a sending station [outside 3] and a sending station [outside 4] the base station [outside 1]8" since the electric wave (frequency f2) of outside 3]10 is receivable — adding — frequency f1 It retransmits a message through radio. a receiving station [outside 5] — identification information "N which shows what "this electric wave goes via a sending station [outside 2] and a sending station [outside 5] the base station [outside 1]8" in 12 since the electric wave (frequency f2) of a sending station [outside 2] is receivable, and ** — seeing — " — adding — frequency f1 It retransmits a message through radio.

[0031] Furthermore, out of [6]13] receiving station [, the electric wave of a sending station [outside 5], a sending station [outside 3], and a sending station [outside 4] is receivable. The measured value of the sending-station identification information of each received electric wave, a frequency, a transmitting number of stages, and a receiving CN ratio is shown in drawing 6 . Since each of these has satisfied the threshold (20dB) of a receiving CN ratio and the identification information of a sending station [outside 6] is not included, the electric wave of the smallest sending station [outside 3] of a transmitting number of stages is chosen. consequently, a receiving station [outside 6] — identification information "N 13 indicates what "this electric wave goes via a sending station [outside 3] and a sending station [outside 6] the base station [outside 1]8" to be, and ** — " — adding — frequency f1 It retransmits a message through radio.

[0032] In this case, although it is necessary to give a frequency-conversion function to radio equipment (radio equipment B (to refer to drawing 5)) compared with the case where the electric wave of single frequency is broadcast again, since the number of stages which can usually be broadcast again can be set up greatly, the electric wave from the outside 1]8 of base station [can be distributed to larger area. Even when two or more frequencies are used, a wireless distribution network can consist of retransmitting a message based on predetermined

conditions in a short time.
[0033] Moreover, the radio equipment A which retransmits a message on the same frequency (f1) as the received electric wave as shown in drawing 1 two frequencies f1 as shown in drawing 5 , and f2 using it -- the frequency of a received electric wave -- f1 it is -- the time -- frequency f2 It retransmits a message. The frequency of a received electric wave is f2. Sometimes, it is a frequency f1. Even when this invention self-multiplication mold wireless distribution network is constituted combining the radio equipment B to broadcast again, a wireless distribution network can be constituted in a short time like the case where it is shown in drawing 2 thru/or drawing 4 , and drawing 6 .
[0034] Although the case where each threshold of a transmitting number of stages and a receiving CN ratio was fixed was explained above, these thresholds can also be changed and set up for every network and every radio equipment. When there are many receivable electric waves as an example, it is setting up low the threshold of the transmitting number of stages set as radio equipment etc. Retransmission of message can be restricted in the area in which it surely retransmits a message to in area with few receiving stations for example, with a suburban background etc., and many receiving stations exist by this in the center of Tokyo. Thus, according to the operating condition of the electric wave in receiving area, a wireless distribution network can be built by making a setup of a threshold adjustable in a short time.
[0035]
[Effect of the Invention] Since the electric wave which should be received is chosen based on the identification information of all the sending stations via which the received electric wave went according to this invention, the electric wave from a local station or a lower-rank office is not chosen accidentally. Moreover, it is hard coming to win popularity the effect of a loop-formation oscillation and the rise of the noise level by the interference wave by controlling retransmission of message based on the identification information of all sending stations and the measured value of a receiving CN ratio via which the received electric wave went, and the transmitting number of stages set up beforehand and the threshold of a CN ratio. Consequently, a stable and good wireless distribution network can be built in a short time.
[0036] Moreover, according to this invention, selection of a received electric wave and retransmission of message are controlled using the information acquired from a received electric wave, and the threshold set up beforehand, and the information from a receiving station (child office) that the transmitted electric wave of the radio equipment concerned is received is not used. Therefore, since the so-called going-up circuit does not need, a wireless distribution network can be constituted cheaply.
[0037] Moreover, according to this invention, a receiving station does not need to retransmit a message in principle, and does not necessarily need to receive the electric wave from a base station directly. therefore, the number of receiving stations follows on increasing, and the number of receivable electric waves increases -- ******** -- a wireless distribution network -- a short time -- and it becomes possible to introduce cheaply.
[0038] Moreover, since according to this invention the redundancy root can be secured because a receiving station retransmits a message, even when the dependability of each propagation root is low, the dependability as the whole network becomes high.
[0039] Moreover, according to this invention, since a transmitting number of stages and each threshold of a CN ratio can be set up per a network unit or radio equipment, a stable and good wireless distribution network can be built in a short time according to the operating condition of an electric wave.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram shows the example of 1 configuration of the radio equipment A which constitutes this invention self-multiplication mold wireless distribution network with the radio equipment which performs a base station and other retransmission of message, and retransmits a message on the same frequency (f1) as the received electric wave.
[Drawing 2] The mimetic diagram shows the 1st operation gestalt of this invention self-multiplication mold wireless distribution network.
[Drawing 3] The mimetic diagram shows the 2nd operation gestalt of this invention self-multiplication mold wireless distribution network.
[Drawing 4] The mimetic diagram shows the 3rd operation gestalt of this invention self-multiplication mold wireless distribution network.
[Drawing 5] two frequencies f1 and f2 using it -- the frequency of a received electric wave -- f1 it is -- the time -- frequency f2 retransmitting a message -- the frequency of a received electric wave -- f2 it is -- the time -- frequency f1 The block diagram shows the example of 1 configuration of the radio equipment B to broadcast again.
[Drawing 6] The mimetic diagram shows the 4th operation gestalt of this invention self-multiplication mold wireless distribution network.
[Description of Notations]
1 Main Track System
2 Receiving Circuit - I
3 Control Section
4 Sending Circuit
5 Received Electric-Wave Selection System
6 Received Electric-Wave Judgment Section
7 Receiving Circuit - II
8 Base Station
9, 10, 11, 12, 13 Receiving station

[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)**公開特許公報（Ａ）**　(11)特許出願公開番号
特開2002－26923
（P2002－26923A）
(43)公開日　平成14年１月25日(2002.1.25)

(51)Int.Cl.⁷	識別記号	ＦＩ		テーマコード（参考）
Ｈ０４Ｌ　12/28		Ｈ０４Ｂ　7/24	Ｂ	５Ｋ０３３
Ｈ０４Ｂ　7/15		Ｈ０４Ｌ　11/00	３１０Ｂ	５Ｋ０６７
7/24		Ｈ０４Ｂ　7/15	Ｚ	５Ｋ０７２

審査請求　未請求　請求項の数３　ＯＬ　（全９頁）

(21)出願番号　特願2000－204691(P2000－204691)

(22)出願日　平成12年７月６日(2000.7.6)

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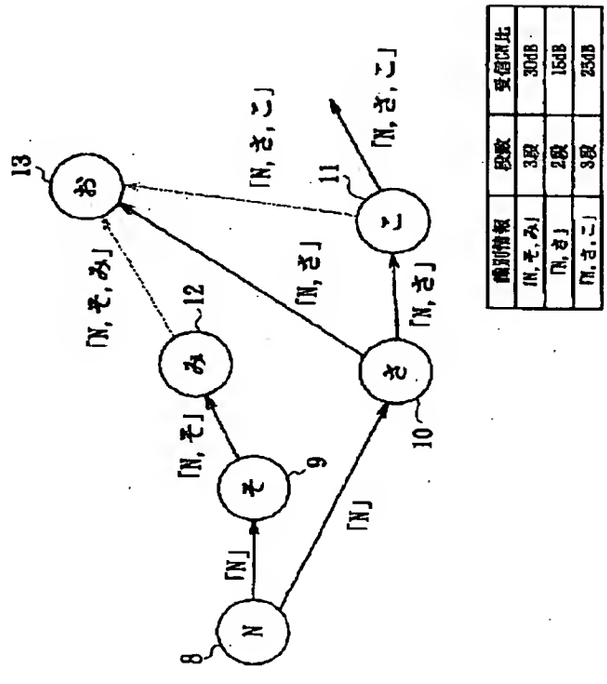
最終頁に続く

(54)【発明の名称】　自己増殖型無線分配ネットワーク

(57)【要約】
【課題】　従来、ループ発振や、干渉波によるノイズレベルの上昇の影響を受けにくく、また、電波の使用状況に応じて、安定で良好な無線分配ネットワークを短時間に構築し得るような自己増殖型無線分配ネットワークは存在しなかった。
【解決手段】　ネットワークを構成する各受信局
【外１】

（そ）・（さ）・（こ）・（み）・（お）

それぞれ９，１０，１１，１２，１３は、再送信をするにあたって、当該受信局を含み、当該受信局に至るまでに経由した全ての送信局を示す送信局の識別情報を送信する手段と、当該受信局が受信したそれぞれの電波についての上記送信局の識別情報から識別される送信段数および受信ＣＮ比の測定値と、あらかじめ設定された送信段数のしきい値およびあらかじめ設定された受信ＣＮ比のしきい値との比較に基づいて、現在受信中の電波を、他の受信電波に切り替えるか否かを判定する判定手段とを少なくとも具えた構成にした。



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【特許請求の範囲】

【請求項１】　基地局と再送信機能を有する複数の受信局とにより構成される自己増殖型無線分配ネットワークであって、

該ネットワークを構成する各受信局は、再送信をするにあたって、当該受信局を含み、当該受信局に至るまでに経由した全ての送信局を示す送信局の識別情報を送信する手段と、当該受信局が受信したそれぞれの電波についての前記送信局の識別情報から識別される送信段数および受信ＣＮ比の測定値と、あらかじめ設定された送信段数のしきい値およびあらかじめ設定された受信ＣＮ比のしきい値との比較に基づいて、現在受信中の電波を、他の受信電波に切り替えるか否かを判定する判定手段とを少なくとも具えたことを特徴とする自己増殖型無線分配ネットワーク。

【請求項２】　請求項１記載の自己増殖型無線分配ネットワークにおいて、前記判定は、前記送信段数が前記あらかじめ設定された送信段数のしきい値よりも小さく、かつ前記受信ＣＮ比の測定値が前記あらかじめ設定された受信ＣＮ比のしきい値よりも高いことを満足するとともに、前記送信段数が最も小さいものであるか否かについて行われることを特徴とする自己増殖型無線分配ネットワーク。

【請求項３】　請求項２記載の自己増殖型無線分配ネットワークにおいて、前記判定は、前記送信段数の最も小さいものが複数ある場合には、それらの中から前記受信ＣＮ比の測定値が最も高いものを選択するように行われること特徴とする自己増殖型無線分配ネットワーク。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、電波を用いたネットワークに係り、特に再送信機能を有する受信局により構成される自己増殖型無線分配ネットワークに関する。

【０００２】

【従来の技術】本発明において、再送信とは、電波により受信した情報の全部あるいは一部を、受信した電波の周波数と同一の周波数、あるいは受信した周波数とは異なった周波数の電波を用いて、再度送信することを言う。

【０００３】受信局が再送信を無条件で行えば、同一周波数によるループ発振が生じたり、干渉波によるノイズレベルが上昇し、安定で良好な無線分配ネットワークを構築することが困難となる。そのため、従来、再送信を行う無線分配ネットワークは、以下のような１対１通信を原則とした無線分配ネットワークで使用されている。

【０００４】すなわち、地上テレビジョン放送における多段中継や、通信における固定マイクロ回線などは、事業者が送信局と受信局の両方を所有し、事業者が周波数の利用状況を管理・把握することで、再送信による上記の問題を回避している。モバイルコンピューティングの

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分野などで、端末どうしで一時的なネットワークを形成する場合は、端末どうしが双方向のやりとりを行うことで、再送信による上記の問題を回避している。

【０００５】

【発明が解決しようとする課題】しかし、無線分配ネットワーク（１対Ｎ通信）では、通常、受信局が、事業者の所有する基地局からの電波を直接受信する形態が採られている。地上テレビジョン放送における各家庭での個別受信や、携帯電話などで基地局から端末への情報伝送は、その典型的な例である。

【０００６】この形態の無線分配ネットワークでは、情報を受け取るべき受信端末が、たとえ隣どうしである場合でも、基地局からそれぞれの受信端末への回線を設定できなければ、サービスを享受することができない。これを、サービスを行う側から見れば、サービスが受けられない少数の受信者のニーズを満足するために、新たに基地局を設置することが必要になることを意味する。従って、基地局の電波を直接受信する形態の無線分配ネットワークを構築するには、基地局を設置するために多くの時間と費用を要するという問題点があった。

【０００７】本発明の目的は、ループ発振や、干渉波によるノイズレベルの上昇の影響を受けにくく、また、電波の使用状況に応じて、安定で良好な無線分配ネットワークを短時間に構築し得るような自己増殖型無線分配ネットワークを提供することにある

【０００８】

【課題を解決するための手段】上記目的を達成するために、本発明自己増殖型無線分配ネットワークは、基地局と再送信機能を有する複数の受信局とにより構成される自己増殖型無線分配ネットワークであって、該ネットワークを構成する各受信局は、再送信をするにあたって、当該受信局を含み、当該受信局に至るまでに経由した全ての送信局を示す送信局の識別情報を送信する手段と、当該受信局が受信したそれぞれの電波についての前記送信局の識別情報から識別される送信段数および受信ＣＮ比の測定値と、あらかじめ設定された送信段数のしきい値およびあらかじめ設定された受信ＣＮ比のしきい値との比較に基づいて、現在受信中の電波を、他の受信電波に切り替えるか否かを判定する判定手段とを少なくとも具えたことを特徴とするものである。

【０００９】また、本発明自己増殖型無線分配ネットワークは、前記判定が、前記送信段数が前記あらかじめ設定された送信段数のしきい値よりも小さく、かつ前記受信ＣＮ比の測定値が前記あらかじめ設定された受信ＣＮ比のしきい値よりも高いことを満足するとともに、前記送信段数の最も小さいものであるか否かについて行われることを特徴とするものである。

【００１０】また、本発明自己増殖型無線分配ネットワークは、前記判定が、前記送信段数の最も小さいものが複数ある場合には、それらの中から前記受信ＣＮ比の測

定値が最も高いものを選択するように行われること特徴とするものである。

【００１１】

【発明の実施の形態】以下に添付図面を参照し、発明の実施の形態に基づいて本発明を詳細に説明する。図１は、基地局および他の再送信を行う無線装置とともに本発明自己増殖型無線分配ネットワークを構成し、受信した電波と同じ周波数（f_1）で、再送信を行う無線装置Ａの一構成例をブロック図にて示している。図１において、１は本線系、２は受信回路－Ｉ、３は制御部、４は送信回路、５は受信電波選択系、６は受信電波分別部、および７は受信回路－IIである。

【００１２】動作につき説明する。本線系１では、無線装置Ａに到来する電波（到来電波は、いずれも周波数（f_1））の中から受信すべき電波を選択し、後述する条件によって再送信制御を行う。符号２で示す受信回路－Ｉは、当該受信回路－Ｉで受信した電波の受信ＣＮ比を測定し、その測定値とともに、その電波が無線装置Ａに到来するまでに経由した全ての送信局の識別情報を解読し、制御部３に送る。受信回路－Ｉにおいて測定された受信ＣＮ比が、制御部３にあらかじめ設定されたＣＮ比のしきい値よりも低い場合には、制御部３からの制御信号（切り替え制御）により受信電波の切り替えを行う。なお、受信回路－Ｉでの受信ＣＮ比が、制御部３にあらかじめ設定されたＣＮ比のしきい値よりも高い場合には、受信電波の切り替えは行わない。これは、電波の切り替えが、必要以上に多くなることを避けるためである。

【００１３】また、送信回路４では、上記のようにして受信電波の切り替えが行われ、または行われないで再送信される電波に、基地局からこの無線装置Ａまでの全ての送信局の識別情報を付加し、受信電波と同じ周波数（f_1）で再送信を行う。再送信の制御も、制御部３からの制御信号（再送信制御）により行う。

【００１４】次に、受信電波選択系５では、この無線装置Ａに到来する複数の電波を時間的・空間的に分別し、分別された信号ごとにモニタリングを行う。まず、受信電波分別部６は、例えば、電波の到来方向や電波到達の遅延時間を利用して、経由した送信局が異なる電波や建物の反射によって遅延時間の異なる電波などに受信電波を分別し、符号７で示す受信回路－IIにそれぞれ供給する。受信回路－IIでは、それら受信電波の各々について受信ＣＮ比を測定するとともに、この無線装置Ａに至るまでに経由した全ての送信局の識別情報を解読し、これらの情報（受信ＣＮ比、送信局の識別情報）を制御部３に送る。なお、制御部３には、以上の他、送信段数のしきい値も設定されている（図１参照）。

【００１５】上述したように、制御部３では、最初に、符号２で示す受信回路－Ｉで受信した電波の受信ＣＮ比の測定値により、切り替え制御が必要か否かの判断を行う。この際、受信ＣＮ比が、制御部３にあらかじめ設定されたＣＮ比のしきい値よりも低い場合には、符号７で示す受信回路－IIで得られたそれぞれの受信電波のＣＮ比の測定値と経由した送信局の識別情報に基づいて、以下の手順で受信すべき、すなわち再送信すべき電波の選択を行う。

【００１６】まず、受信回路－IIに供給された受信電波の候補の中から、上述の受信ＣＮ比のしきい値および送信段数のしきい値の条件を満足していないものを除外する。次に、送信局の識別情報の中に、この無線装置Ａの識別情報を含むものは、ループ発振を生じてしまうことになるので候補から除外する。以上により、候補として残ったものの中から、送信段数の小さいものを選択する。また、送信段数の同じものが複数選択された場合には、それらの中で受信ＣＮ比の測定値の最も高いものを選ぶ。以上の手順により、切り替え候補が１つに絞られた場合、制御部３は、ネットワークごとに設定したタイミングで、切り替え処理を行うための制御信号（切り替え制御）を符号２で示す受信回路－Ｉに送る。なお、上記の手順によっても切り替え候補が残らない場合には、受信電波の切り替えは行わない。

【００１７】以上において、受信する電波の切り替えは、建物や樹木による遮蔽、新しい基地局や受信局の設置、降雨による減衰などで、受信ＣＮ比が大きく変化したときに生じることが考えられる。符号２で示す受信回路－Ｉは、制御部３からの切り替え制御に従い、到来電波の中から受信すべき電波を選択する。電波の選択には、受信電波分別部６で行っている分別方法を用いるものとする。例えば、受信電波分別部６で、電波の到来方向の情報だけを用いた場合、受信回路－Ｉでは、その受信回路に接続された受信アンテナの指向性を電気的あるいは機械的に変化させて、所望の方向から到来する電波（選択すべき電波）を受信するものとする。

【００１８】上述したように、この無線装置Ａでは、符号２で示す受信回路－Ｉで受信した電波を原則として再送信するが、その電波の基地局からの送信段数が、制御部３にあらかじめ設定したしきい値よりも大きい場合、または受信ＣＮ比の測定値が、制御部３にあらかじめ設定したしきい値よりも低い場合には、そのまま再送信を行うことのデメリットが大きいものとして再送信を行わない。このような動作を行うために、制御部３は、ネットワークごとに設定したタイミングで、再送信の停止、および再送信の開始を行うように、送信回路４に対して再送信制御を行う。

【００１９】なお、本発明自己増殖型無線分配ネットワークでは、それを構成する無線装置は、受信した電波に多重された送信局の識別情報を解読し、送信する電波に当該受信局に至るまでに経由した全ての送信局の識別情報を多重することが必要である。送信局の識別情報としては、既存の技術を使って、周波数、時間、符号のいず

れかの多重を行うものとする。

【００２０】図２は、本発明自己増殖型無線分配ネットワークの第１の実施形態を模式図にて示している。図２において、８は基地局

【外１】

、９は受信局

【外２】

、１０は受信局

【外３】

、１１は受信局

【外４】

、１２は受信局

【外５】

、そして１３は受信局

【外６】

をそれぞれ示している。以下においては、受信局〔外２〕９、〔外３〕１０、〔外４〕１１、〔外５〕１２、〔外６〕１３が再送信した場合に、それら受信局を、それぞれ送信局〔外２〕、〔外３〕、〔外４〕、〔外５〕、〔外６〕と呼ぶことにする。また、基地局〔外１〕８を送信局の１段目と数えて当該局が４段目以降となる場合には、再送信を行わないことにし、ＣＮ比のしきい値は２０ｄＢとする。なお、図２中、かぎかっこで囲まれた文字列は、送信局の識別情報を表している。

【００２１】動作につき説明する。まず、基地局〔外１〕８において、「この電波は、基地局〔外１〕８から送信されたものである」ことを示す識別情報「Ｎ」を付加して電波を発射する。基地局〔外１〕８から発射された電波は、受信局〔外２〕９および受信局〔外３〕１０で直接受信することができる。受信局〔外２〕９で、この受信した電波を再送信するにあたり、「この電波は、基地局〔外１〕８および送信局〔外２〕を経由したものである」ことを示す識別情報「Ｎ，そ」を付加して再送信する。同様に、受信局〔外３〕１０では、「この電波は、基地局〔外１〕８および送信局〔外３〕を経由したものである」ことを示す識別情報「Ｎ，さ」を付加して再送信する。

【００２２】また、受信局〔外４〕１１では、送信局〔外３〕の電波を受信できるので、「この電波は、基地局〔外１〕８、送信局〔外３〕および送信局〔外４〕を経由したものである」ことを示す識別情報「Ｎ，さ，こ」を付加して再送信する。以下同様に、受信局〔外５〕１２では、送信局〔外２〕の電波を受信できるので、「この電波は、基地局〔外１〕８、送信局〔外２〕および送信局〔外５〕を経由したものである」ことを示す識別情報「Ｎ，そ，み」を付加して再送信する。

【００２３】さらに、受信局〔外６〕１３では、送信局〔外５〕と送信局〔外３〕と送信局〔外４〕の電波を受信することができ、これらの信号が、図１に示す無線装置Ａ中の受信回路７（受信回路－II）で受信される。受信された電波のそれぞれの送信局識別情報、送信段数、および受信ＣＮ比の測定値が、図２に示されている。まず、送信局〔外３〕からの電波の受信ＣＮ比の測定値は、受信ＣＮ比のしきい値（２０ｄＢ）を満足していないので除外される。送信局〔外５〕と送信局〔外４〕からの電波は、自局の識別情報（送信局〔外６〕の識別情報）を含んでいない。また、送信段数も３段で等しい。従って、受信ＣＮ比が大きな方の電波、すなわち、送信局〔外５〕からの電波が選択される。

【００２４】こうして、送信局〔外５〕からの電波を選択すると、受信局〔外６〕１３は、基地局〔外１〕８から数えて４段目となるので、再送信しない。このように、受信局が所定の条件に基づいて再送信を行っていくことで、無線分配ネットワークを短時間に構成することができる。

【００２５】図３は、本発明自己増殖型無線分配ネットワークの第２の実施形態を模式図にて示している。図３は、図２に示した無線分配ネットワークの構成で、送信局〔外５〕から受信局〔外６〕１３への伝搬ルートが遮蔽されている点において図２と異なっている。受信局〔外６〕１３では、送信局〔外３〕と送信局〔外４〕の電波が受信される。受信された電波のそれぞれの送信局識別情報、送信段数、および受信ＣＮ比の測定値が、図３に示されている。図１に示す無線装置Ａ中の制御部３の動作で説明した手順に従い、本実施形態の場合は、送信局〔外４〕の電波が選択され、ネットワークで決められたタイミングで、受信電波の切り替えが行われる。

【００２６】受信電波が切り替えられても、受信局〔外６〕１３は、基地局〔外１〕８から数えて４段目となるので、再送信しない。本発明によれば、このように、受信局が所定の条件に基づいて次々と再送信を行っていくことで、冗長な伝搬ルートを確保でき、従って、個々の伝搬ルートの信頼性が低い場合でも、無線分配ネットワークとしての信頼性を確保することができる。

【００２７】図４は、本発明自己増殖型無線分配ネットワークの第３の実施形態を模式図にて示している。図４は、図２に示した無線分配ネットワークの構成で、伝搬ルートに建物による反射がある場合である。受信局〔外

３〕１０では、基地局〔外１〕８からの直接受信に加えて、自局の電波が建物１４で反射した電波（基地局〔外１〕８と送信局〔外３〕を経由して）も受信される。図１に示す無線装置Ａ中の受信回路７（受信回路－II）には、この２つの電波が候補として受信される。後者を選択すると、ループ発振が生じ、また、基地局〔外１〕８からの電波が届かなくなる。しかし、無線装置Ａ中の制御部３の動作で説明したように、自局（送信局としての）の識別情報を含む電波は、候補に残らないため、これを受信するような電波の切り替えは生じない。

【００２８】以上の説明においては、受信局における受信電波と再送信電波が同一周波数の場合を説明したが、受信電波と再送信電波が異なる周波数の場合についても、同様な効果を得ることができる。図５は、２つの周波数f_1，f_2を使用し、受信電波の周波数がf_1のときには周波数f_2で再送信し、受信電波の周波数がf_2のときには周波数f_1で再送信する無線装置Ｂの一構成例をブロック図にて示している。図５においても、その回路構成は図１に示したものと基本的に同じであるが、受信回路２（受信回路－Ｉ）、送信回路４、受信電波分別部６および受信回路７（受信回路－II）は、周波数f_1およびf_2の両方に対応できる回路である点において異なっている。なお、本例においては、受信周波数から送信周波数への周波数変換が必要となるが、これを受信回路２（受信回路－Ｉ）あるいは送信回路４で行う場合と、受信回路２（受信回路－Ｉ）でＩＦ周波数に変換した後に送信回路４で送信周波数に変換する場合の二通りの方法がある。

【００２９】図６は、本発明自己増殖型無線分配ネットワークの第４の実施形態を模式図にて示している。図６は、図２に示した無線分配ネットワークの構成で、再送信を行う無線装置に図５に示す無線装置Ｂを使用して、受信電波の周波数がf_1のときには周波数f_2で再送信し、受信電波の周波数がf_2のときには周波数f_1で再送信するようにしたものである。まず、基地局〔外１〕８では、「この電波は、基地局〔外１〕８から送信されたものである」ことを示す識別情報「Ｎ」を付加して、周波数f_1の電波を発射する。次に、受信局〔外２〕９では、基地局〔外１〕８からの周波数f_1の電波を受信し、「この電波は、基地局〔外１〕８、送信局〔外２〕を経由したものである」ことを示す識別情報「Ｎ，そ」を付加して、周波数f_2の電波で再送信する。また、受信局〔外３〕１０では、基地局〔外１〕８からの周波数f_1の電波を受信し、「この電波は、基地局〔外１〕８、送信局〔外３〕を経由したものである」ことを示す識別情報「Ｎ，さ」を付加して、周波数f_2の電波で再送信する。

【００３０】また、受信局〔外４〕１１では、送信局〔外３〕１０の電波（周波数f_2）を受信できるので、「この電波は、基地局〔外１〕８、送信局〔外３〕および送信局〔外４〕を経由したものである」ことを示す識別情報「Ｎ，さ，こ」を付加して、周波数f_1の電波で再送信する。受信局〔外５〕１２では、送信局〔外２〕の電波（周波数f_2）を受信できるので、「この電波は、基地局〔外１〕８、送信局〔外２〕および送信局〔外５〕を経由したものである」ことを示す識別情報「Ｎ，そ，み」を付加して、周波数f_1の電波で再送信する。

【００３１】さらに、受信局〔外６〕１３では、送信局〔外５〕と送信局〔外３〕と送信局〔外４〕の電波を受信できる。受信されたそれぞれの電波の送信局識別情報、周波数、送信段数および受信ＣＮ比の測定値を図６に示す。これらはいずれも受信ＣＮ比のしきい値（２０ｄＢ）を満足していて、また、送信局〔外６〕の識別情報を含んでいないので、送信段数の最も小さい送信局〔外３〕の電波が選択される。その結果、受信局〔外６〕１３は、「この電波は、基地局〔外１〕８、送信局〔外３〕および送信局〔外６〕を経由したものである」ことを示す識別情報「Ｎ，さ，お」を付加して、周波数f_1の電波で再送信する。

【００３２】この場合、単一周波数の電波を再送信する場合に比べて、無線装置（無線装置Ｂ（図５参照））に周波数変換機能を持たせることが必要になるが、通常は再送信可能な段数を大きく設定することができるので、基地局〔外１〕８からの電波を、より広いエリアに分配することができる。複数の周波数を用いた場合でも、所定の条件に基づいて再送信を行っていくことで、無線分配ネットワークを短時間に構成することができる。

【００３３】また、図１に示すような受信した電波と同じ周波数（f_1）で、再送信を行う無線装置Ａと、図５に示すような２つの周波数f_1，f_2を使用し、受信電波の周波数がf_1のときには周波数f_2で再送信し、受信電波の周波数がf_2のときには周波数f_1で再送信する無線装置Ｂとを組み合わせて本発明自己増殖型無線分配ネットワークを構成した場合でも、図２ないし図４、および図６に示した場合と同様に無線分配ネットワークを短時間に構成することができる。

【００３４】以上においては、送信段数および受信ＣＮ比の各しきい値が一定の場合について説明したが、ネットワークごとに、あるいは無線装置ごとに、これらのしきい値を変えて設定することもできる。一例として、受信可能な電波の数が多い場合には、無線装置に設定する送信段数のしきい値を低く設定するなどである。これにより、例えば、郊外地などで受信局が少ないエリアでは再送信を必ず行い、都心部で受信局が多く存在するエリアでは再送信を制限することができる。このように、しきい値の設定を可変にすることで、受信エリアにおける電波の使用状況に応じて、無線分配ネットワークを短時間に構築することができる。

【００３５】

【発明の効果】本発明によれば、受信した電波が経由したすべての送信局の識別情報に基づいて、受信すべき電波の選択を行っていくので、自局や下位局からの電波を誤って選択することがない。また、受信した電波が経由したすべての送信局の識別情報と受信ＣＮ比の測定値と、あらかじめ設定した送信段数とＣＮ比のしきい値に基づいて再送信の制御を行うことで、ループ発振や、干渉波によるノイズレベルの上昇の影響を受けにくくなる。その結果、安定で良好な無線分配ネットワークを短時間に構築することができる。

【００３６】また、本発明によれば、受信電波から得られる情報と、あらかじめ設定したしきい値とを利用して受信電波の選択と再送信の制御を行い、当該無線装置の送信電波を受信している受信局（子局）からの情報は利用していない。従って、いわゆる上り回線は必要としないので、無線分配ネットワークを安価に構成することができる。

【００３７】また、本発明によれば、受信局は原則として再送信を行い、必ずしも基地局からの電波を直接受信する必要がない。したがって、受信局の数が増えるに伴い、受信可能な電波の数が増えることになり、無線分配ネットワークを短時間に、かつ安価に導入することが可能になる。

【００３８】また、本発明によれば、受信局が再送信をすることで、冗長ルートを確保できるようになるので、個々の伝搬ルートの信頼性が低い場合でも、ネットワーク全体としての信頼性が高くなる。

【００３９】また、本発明によれば、送信段数とＣＮ比の各しきい値を、ネットワーク単位あるいは無線装置単位で設定することができるので、電波の使用状況に応じ＊て、安定で良好な無線分配ネットワークを短時間に構築することができる。

【図面の簡単な説明】

【図１】　基地局および他の再送信を行う無線装置とともに本発明自己増殖型無線分配ネットワークを構成し、受信した電波と同じ周波数（f_1）で、再送信を行う無線装置Ａの一構成例をブロック図にて示している。

【図２】　本発明自己増殖型無線分配ネットワークの第１の実施形態を模式図にて示している。

【図３】　本発明自己増殖型無線分配ネットワークの第２の実施形態を模式図にて示している。

【図４】　本発明自己増殖型無線分配ネットワークの第３の実施形態を模式図にて示している。

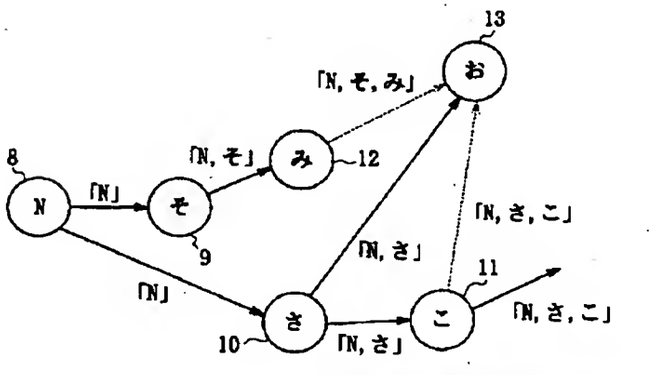
【図５】　２つの周波数f_1，f_2を使用し、受信電波の周波数がf_1のときには周波数f_2で再送信し、受信電波の周波数がf_2のときには周波数f_1で再送信する無線装置Ｂの一構成例をブロック図にて示している。

【図６】　本発明自己増殖型無線分配ネットワークの第４の実施形態を模式図にて示している。

【符号の説明】

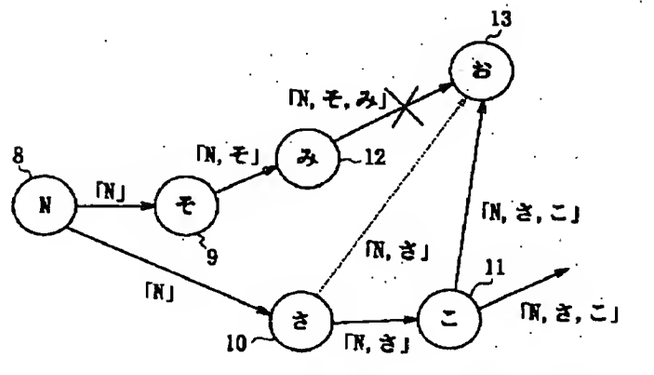
1　本線系
2　受信回路－Ｉ
3　制御部
4　送信回路
5　受信電波選択系
6　受信電波分別部
7　受信回路－II
8　基地局
9，１０，１１，１２，１３　受信局

【図２】



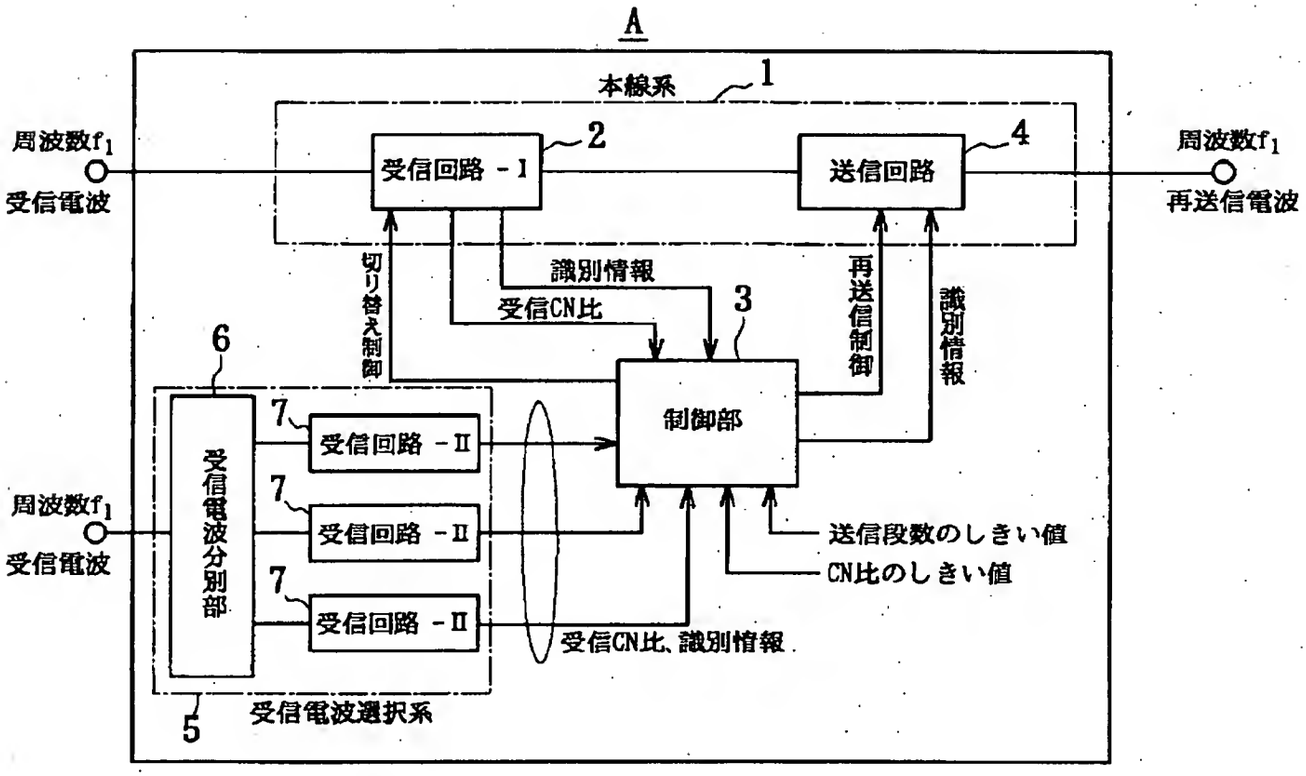
識別情報	段数	受信CN比
「N, そ, み」	3段	30dB
「N, さ」	2段	15dB
「N, さ, こ」	3段	25dB

【図３】

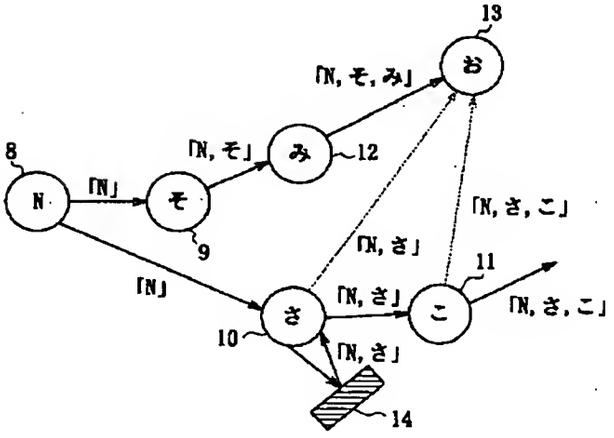


識別情報	段数	受信CN比
「N, さ」	2段	15dB
「N, さ, こ」	3段	25dB

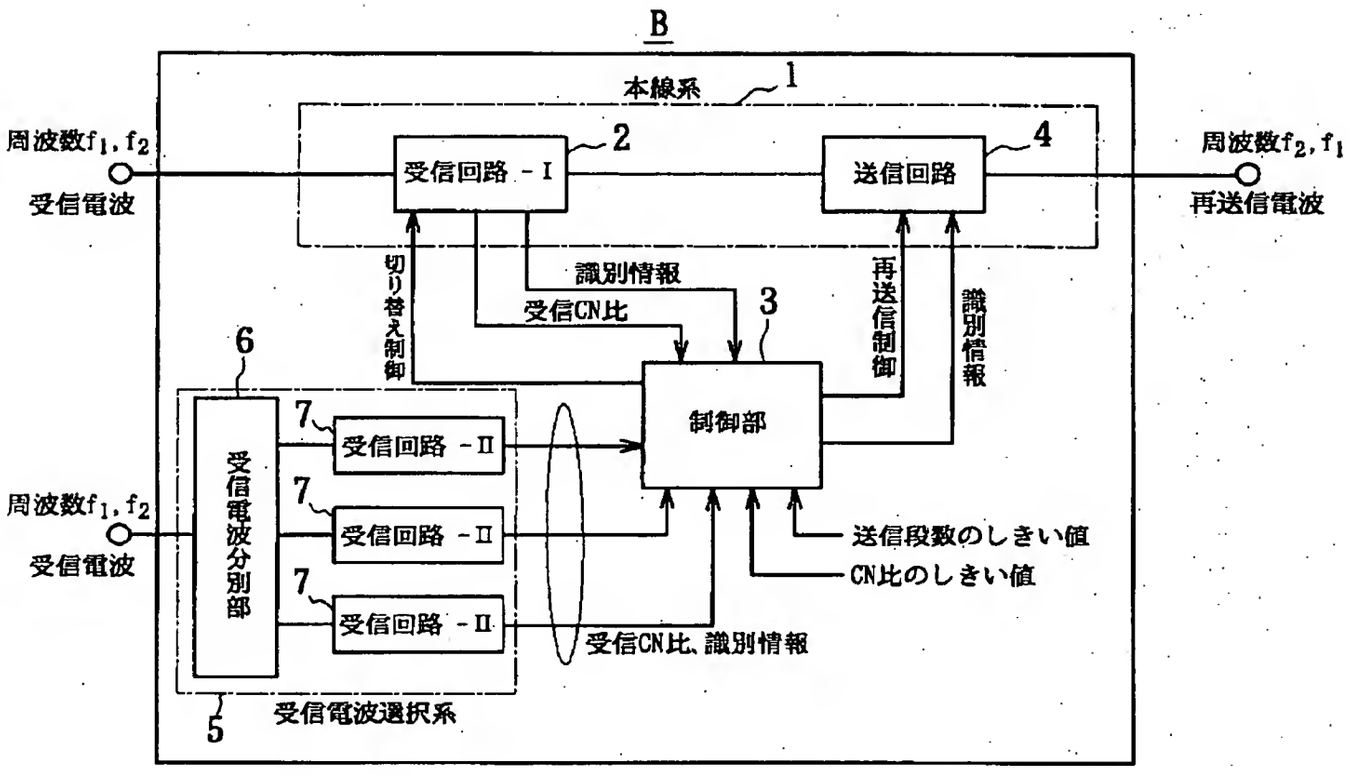
【図１】


A
本線系
1
周波数f1
受信電波
受信回路 －I
2
送信回路
4
周波数f1
再送信電波
切り替え制御
識別情報
受信CN比
3
再送信制御
識別情報
6
制御部
7
受信回路 －II
7
受信回路 －II
7
受信回路 －II
周波数f1
受信電波
受信電波分別部
送信段数のしきい値
CN比のしきい値
受信CN比、識別情報
5
受信電波選択系

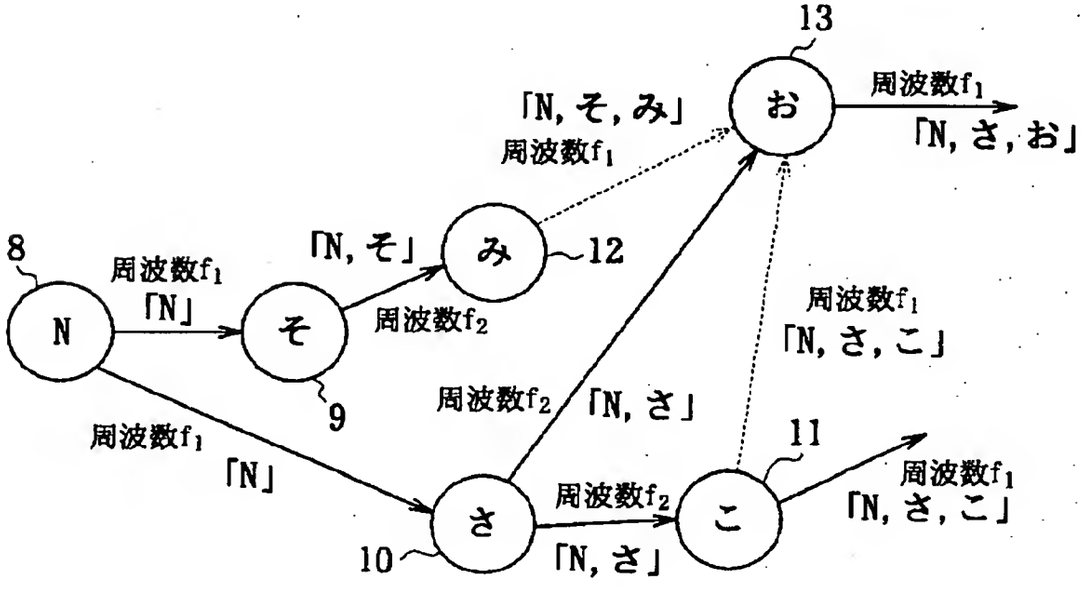
【図４】


13
お
「N, そ, み」
8
N
「N」
「N, そ」
そ
み
12
9
「N, さ」
「N, さ, こ」
「N」
11
「N, さ」
さ
こ
「N, さ, こ」
10
「N, さ」
14

【図５】



【図６】



識別情報	周波数	段数	受信CN比
「N, そ, み」	f_1	3段	30dB
「N, さ」	f_2	2段	20dB
「N, さ, こ」	f_1	3段	25dB

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Ｆターム(参考)　5K033 AA07 CB01 DA02 DA17 DB20 EA06
5K067 AA04 AA22 AA26 AA33 AA41 BB04 CC24 DD19 DD43 DD45 EE02 EE10 EE22 FF16 GG07 GG11 HH22
5K072 AA05 AA18 AA24 AA26 AA29 BB01 BB13 BB14 BB25 CC02 CC33 DD11 DD16 DD17 EE13 EE33 GG14 GG27